



Report to the Ranking Member,
Committee on Commerce, Science, and
Transportation, U.S. Senate

April 2019

SCIENTIFIC INTEGRITY POLICIES

Additional Actions Could Strengthen Integrity of Federal Research

GAO Highlights

Highlights of GAO-19-265, a report to the Ranking Member, Committee on Commerce, Science, and Transportation, U.S. Senate

Why GAO Did This Study

In 2007, the America COMPETES Act required the Office of Science and Technology Policy (OSTP) to take actions to enhance the integrity of federal scientific research. In 2010, OSTP provided guidance to federal agencies on developing scientific integrity policies. The guidance states that, among other things, agencies are to ensure that political appointees should not suppress or alter scientific findings.

GAO was asked to review agencies' scientific integrity policies and actions taken to implement them. This report examines, among other things, the extent to which selected agencies (1) have taken actions to achieve the objectives of their scientific integrity policies and (2) have procedures for identifying and addressing alleged violations of their scientific integrity policies. GAO selected the following nine agencies for review: Agricultural Research Service, Environmental Protection Agency, FAA, FE, National Institutes of Health, NASA, NIST, NOAA, and USGS. GAO analyzed the selected agencies' scientific integrity policies and interviewed agency officials, among other things.

What GAO Recommends

GAO is making 10 recommendations to six agencies to address specific issues related to educating staff, providing oversight, monitoring and evaluating policy implementation, and developing procedures to identify and address policy violations. The six agencies agreed with GAO's recommendations and identified actions they plan to take to address them.

View GAO-19-265. For more information, contact John Neumann at (202) 512-6888 or neumannj@gao.gov.

April 2019

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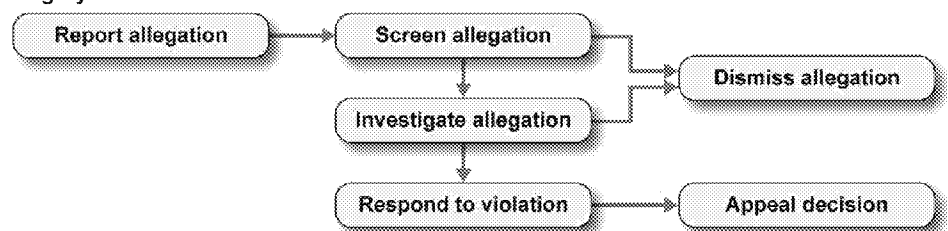
What GAO Found

The nine selected agencies GAO reviewed have taken various actions to help achieve the objectives of their scientific integrity policies in three areas:

- **Educating staff.** Seven of the nine agencies have taken some actions to educate and communicate to staff about their policies, consistent with the 2007 America COMPETES Act. However, the Office of Fossil Energy (FE), which follows the Department of Energy's (DOE) policy, and the National Institute of Standards and Technology (NIST) have not taken action.
- **Providing oversight.** Eight of the nine agencies have a designated official, or the equivalent, to oversee implementation of their scientific integrity policies. However, FE does not have such an official because DOE has not appointed one and currently has no plans or timeframe to do so, although DOE policy states that DOE will appoint an official for oversight.
- **Monitoring and evaluating implementation.** Four of the nine agencies have monitored and evaluated implementation of their scientific integrity policies, consistent with federal standards that call for such control activities. However, FE, the Federal Aviation Administration (FAA), NIST, the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Geological Survey (USGS) have not undertaken such activities.

Seven of the nine agencies have specific, documented procedures for identifying and addressing alleged violations of their scientific integrity policies. Although the details of agencies' procedures vary, they generally include the steps shown below. However, two agencies—FE, following DOE's policy, and the National Aeronautics and Space Administration (NASA)—do not have documented procedures for identifying and addressing alleged violations. A 2009 presidential memo on scientific integrity states that agencies should have procedures to identify and address instances in which the scientific process or the integrity of scientific and technological information may be compromised. Without procedures, FE and NASA do not have assurance that their staff understand how to report allegations and that investigations are conducted consistently.

General Procedure for Identifying and Addressing Alleged Violations of Agencies' Scientific Integrity Policies



Source: GAO analysis of selected agencies' information. | GAO-19-265

Note: The seven agencies that have procedures similar to this figure are the Agricultural Research Service, Environmental Protection Agency, Federal Aviation Administration, National Institutes of Health, National Institute of Standards and Technology, National Oceanic and Atmospheric Administration, and U.S. Geological Survey.

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Abbreviations

ARS	Agricultural Research Service
Commerce	Department of Commerce
DOE	Department of Energy
DOT	Department of Transportation
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FE	Office of Fossil Energy
HHS	Department of Health and Human Services
Interior	Department of the Interior
NASA	National Aeronautics and Space Administration
NIH	National Institutes of Health
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
OIG	Office of Inspector General
OSTP	Office of Science and Technology Policy
OSC	U.S. Office of Special Counsel
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

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April 4, 2019

The Honorable Maria Cantwell
Ranking Member
Committee on Commerce, Science, and Transportation
United States Senate

Dear Senator Cantwell:

In 2004 and 2008, the Union of Concerned Scientists reported that political influences had adversely affected the integrity of federally funded science, especially science related to the environment, public health, and national security.¹ Additionally, an investigation by the National Aeronautics and Space Administration's (NASA) Office of Inspector General (OIG) found that from the fall of 2004 through early 2006, the NASA Headquarters Office of Public Affairs managed the topic of climate change in a manner that reduced, marginalized, or mischaracterized science information related to climate change that was made available to the general public through news releases and media access.²

The America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science (COMPETES) Act of 2007 required the Office of Science and Technology Policy (OSTP) to develop an overarching set of scientific integrity principles.³ According to the act, these principles should ensure the communication and open exchange of data and research results conducted by federal scientists and prevent the intentional or unintentional suppression or distortion of such research

¹Union of Concerned Scientists, *Scientific Integrity in Policymaking: An Investigation into the Bush Administration's Misuse of Science* (Cambridge, MA: March 2004), and Union of Concerned Scientists, *Federal Science and the Public Good: Securing the Integrity of Science in Policy Making – Presidential Transition Update* (Cambridge, MA: December 2008).

²National Aeronautics and Space Administration, Office of Inspector General, *Investigative Summary Regarding Allegations that NASA Suppressed Climate Change Science and Denied Media Access to Dr. James E. Hansen, a NASA Scientist* (Washington, D.C.: June 2, 2008).

³Pub. L. No. 110-69, 121 Stat., 572 (2007). This requirement was to be carried out in consultation with the Director of the Office of Management and Budget and the heads of all federal civilian agencies that conduct scientific research.

findings.⁴ OSTP issued guidance, most recently in 2010,⁵ to the heads of executive departments and agencies on implementing scientific integrity policies. OSTP's guidance states that scientific integrity is important because, among other things, scientific and technological information is often a significant contributor to the development of sound public policy. OSTP's guidance also states that agencies should develop scientific integrity policies that, among other things, ensure a culture of scientific integrity and that political appointees should not suppress or alter scientific or technological findings. In response to the 2010 guidance, 24 federal departments and agencies developed scientific integrity policies.

Since 2010, however, allegations of agency officials inappropriately influencing science continue to be reported. In August 2018, for example, the Union of Concerned Scientists again reported that some federal officials had inappropriately censored and influenced scientific research.⁶ The Union of Concerned Scientists surveyed federal scientists in 2018, and many survey respondents reported censorship of their work, especially work related to climate change. According to representatives at the Union of Concerned Scientists, some agency officials may also be able to influence science by promoting the research that aligns with their political agenda, which may avoid violating the scientific integrity policies altogether.

You asked us to review federal agencies' scientific integrity policies and agencies' actions to implement them. For this review, we examined agencies' scientific integrity policies and did not assess the extent to which agency officials may try to influence scientific research or examine how scientific and technological information is used in agencies' development of public policy. Specifically, this report examines the extent to which selected agencies (1) have scientific integrity policies that are

⁴The primary function of the Director of OSTP is to provide advice, within the Executive Office of the President of the United States, on the scientific, engineering, and technological aspects of issues. OSTP serves as a source of scientific and technological analysis and judgment for the President of the United States with respect to major policies, plans, and programs of the federal government.

⁵Office of Science and Technology Policy, *Scientific Integrity*, Memorandum for the Heads of Executive Departments and Agencies (December 17, 2010), accessed October 26, 2018, <https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/scientific-integrity-memo-12172010.pdf>.

⁶Union of Concerned Scientists, *Science under President Trump: Voices of Scientists across 16 Federal Agencies* (Cambridge, MA: August 2018).

consistent with federal guidance, (2) have taken actions to achieve the objectives of their scientific integrity policies, and (3) have procedures for identifying and addressing alleged violations of their scientific integrity policies.

For all three objectives, we selected a nongeneralizable sample of nine agencies—seven agencies from cabinet-level departments and two independent agencies. We selected these nine agencies because they are civilian federal agencies that conduct scientific research, employ federal scientists, and were among the federal agencies with the greatest levels of funding for intramural research (i.e., research conducted by federal agencies in their own facilities). Our findings are not generalizable to all agencies but provide illustrative examples of these agencies' scientific integrity policies and their actions to implement those policies. The agencies we selected are the

- Agricultural Research Service (ARS) in the U.S. Department of Agriculture (USDA);
- Environmental Protection Agency (EPA), an independent agency;
- Federal Aviation Administration (FAA) in the Department of Transportation (DOT);
- Office of Fossil Energy (FE) in the Department of Energy (DOE);
- National Institutes of Health (NIH) in the Department of Health and Human Services (HHS);
- NASA, an independent agency;
- National Institute of Standards and Technology (NIST) in the Department of Commerce (Commerce);
- National Oceanic and Atmospheric Administration (NOAA) in Commerce; and
- U.S. Geological Survey (USGS) in the Department of the Interior (Interior).

We reviewed the nine agencies' scientific integrity policies, procedures, and related documents. Some agencies we selected do not have agency-specific scientific integrity policies or procedures because they follow department-level policies or procedures. In those cases, we included the department's policy and procedures in our analyses. For our reporting purposes, we describe an agency as having a policy or procedure even in those cases where the agency is following a department-level policy or procedure.

To determine the extent to which the selected agencies have policies that are consistent with federal guidance on scientific integrity, we compared the selected agencies' scientific integrity policies and supporting documents to two of the four principles identified in OSTP's guidance:⁷ (1) *foundations of scientific integrity in government* and (2) *professional development of government scientists and engineers*.⁸ We focused on these two principles because they most closely align with scientific integrity issues related to political influence.⁹ We determined that an agency addresses a principle if its scientific integrity policy, related policies, or related actions directly address the principle described in OSTP's guidance. To determine the extent to which selected agencies have taken actions to achieve the objectives of their scientific integrity policies, we compared agencies' scientific integrity policies and actions to implement their policies against the *Standards for Internal Control in the Federal Government*.¹⁰ Specifically, we compared agencies' policies and actions against standards related to communicating information to staff, providing oversight, and monitoring and evaluating performance because these standards are the most relevant to ensuring that an agency's program meets its objectives. In doing so, we reviewed the selected agencies' policies and their actions to implement these policies and interviewed agency officials. To determine the extent to which the selected agencies have procedures for identifying and addressing alleged violations of their scientific integrity policies, we reviewed the agencies' procedures and related documents that establish such procedures. We compared the agencies' procedures to guidance on scientific integrity policies and federal standards for internal control. See appendix I for more information on our objectives, scope, and methodology.

We conducted this performance audit from March 2018 to April 2019 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that

⁷OSTP's guidance on scientific integrity has four main sections with guidance, which we refer to as principles, and the four principles have subsections, which we refer to as components.

⁸From this point forward, we will refer to scientists and engineers collectively as scientists.

⁹The two principles in OSTP's guidance that we did not include in our analyses are (1) public communications and (2) use of federal advisory committees.

¹⁰GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.: September 2014).

the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

The America COMPETES Act of 2007 (the act) requires the Director of OSTP to ensure that all civilian federal agencies that conduct scientific research develop specific policies and procedures regarding the public release of data and results of research conducted by their scientists. In particular, the act requires that these policies and procedures (1) specifically address what is and what is not permitted or recommended under such policies and procedures, (2) be specifically designed for each agency, (3) be applied uniformly throughout each agency, and (4) be widely communicated and readily accessible to all employees of each agency and the public.

In May 2008, in response to this requirement, OSTP sent a memorandum to federal agencies that provided guidance on the communication of scientific information with the media and open exchange of research data by federal scientists.¹¹ In March 2009, the President issued a memorandum that assigned responsibility to the Director of OSTP for ensuring the highest level of integrity in all aspects of the executive branch's involvement with scientific and technological processes.¹² According to the 2009 memorandum, the objectives of federal scientific integrity policies are to, among other things, promote the public's trust in the science and scientific process informing public policy decisions and prevent political appointees from suppressing or altering scientific or technological findings and conclusions. In particular, the 2009 memorandum required the Director of OSTP to, among other things, develop recommendations for presidential action designed to guarantee scientific integrity throughout the executive branch. The memorandum states, for example, that each agency should have procedures to identify and address instances in which the scientific process or the integrity of scientific and technological information may be compromised, which agencies were required to carry out to the extent permitted by law and consistent with their statutory and regulatory authorities and their enforcement mechanisms.

¹¹Office of Science and Technology Policy, *Principles for the Release of Scientific Research Results*, Memorandum (Washington, D.C.: May 28, 2008).

¹²The White House, Office of the Press Secretary, *Scientific Integrity*, Memorandum for the Heads of Executive Departments and Agencies (Washington, D.C.: March 9, 2009).

In December 2010, OSTP issued a memorandum to provide further guidance to executive departments and agencies to implement the administration's policies on scientific integrity. OSTP's guidance listed four broad principles of scientific integrity, and each principle has several components that provide guidance toward meeting each principle.

OSTP tasked the Institute for Defense Analyses' Science and Technology Policy Institute to, among other things, review federal agencies' scientific integrity policies to identify potential good practices for meeting or exceeding the principles listed in the 2010 OSTP guidance.¹³ OSTP also asked the institute to suggest ways to strengthen the policies to reflect current interests and developments. In December 2016, the Institute for Defense Analyses' Science and Technology Policy Institute issued a report that, among other things, identified good practices for scientific integrity policies and their implementation.¹⁴ For example, to promote a culture of integrity, the report states that agencies should train scientists and nonscientists on the importance of scientific integrity and issue periodic bulletins or newsletters to remind personnel of the importance of scientific integrity.

Selected Agencies Have Scientific Integrity Policies That Are Generally Consistent with Federal Guidance

All nine of the selected agencies have policies that are generally consistent with OSTP's guidance for the two principles of scientific integrity that we reviewed: *foundations of scientific integrity in government* and *professional development of government scientists and engineers*. To address these principles, the selected agencies either developed their own scientific integrity policies or followed policies developed by their respective departments. Specifically,

- EPA and NASA are independent agencies that developed their own scientific integrity policies;
- NIH, NIST, NOAA, and USGS developed their own scientific integrity policies, in addition to the policies developed by their departments; and

¹³The Institute for Defense Analyses' Science and Technology Policy Institute is a federally funded research and development center chartered by Congress. It provides analysis of science and technology policy issues for the White House Office of Science and Technology Policy and other offices and councils within the executive branch of the U.S. government and federal agencies.

¹⁴Institute for Defense Analyses' Science and Technology Policy Institute, *Review of Federal Agency Policies on Scientific Integrity* (Washington, D.C.: December 2016).

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- ARS, FAA, and FE did not develop their own scientific integrity policies and instead follow policies developed by their departments—USDA, DOT, and DOE, respectively.

We found that all nine of the selected agencies address all of the components of the two principles of scientific integrity we analyzed either (1) through their scientific integrity policies, (2) in related policies, or (3) through related actions. OSTP's guidance describes several components for each of the two principles that we reviewed, which the selected agencies addressed in different ways. Under the principle *foundations of scientific integrity in government*, OSTP's guidance states that successful application of science in public policy depends on the integrity of the scientific process, both to ensure the validity of the information itself and to engender public trust in government. It is for this reason, according to the guidance, that agencies should develop policies that address seven specific components of this principle. Below are the seven components of this principle and examples of how some of the nine selected agencies address these components:

- **Culture of scientific integrity.** OSTP's guidance states that agencies should ensure a culture of scientific integrity. OSTP's guidance explains that science, and public trust in science, thrives in an environment that shields scientific data and analyses from inappropriate political influence. We found that all nine of the selected agencies have addressed this component. For example, Interior's scientific integrity official—an official designated by the Deputy Secretary to provide department-wide leadership for implementing Interior's scientific integrity policy, among other duties—sent a memo in February 2018 to the heads of all agencies in the department, including USGS, to remind them of their roles related to scientific integrity. According to Interior and USGS officials, this and other actions demonstrated the department's commitment to scientific integrity and helped foster a culture of scientific integrity.
- **Selection of candidates for scientific positions.** OSTP's guidance states that agencies' policies should ensure that selection of candidates for scientific positions in the executive branch is based primarily on their scientific and technological knowledge, credentials, experience, and integrity. We found that all nine of the selected agencies have addressed this component. For example, DOT's scientific integrity policy, which FAA follows, states that the basis for the selection of candidates for science and technological positions will be the candidate's knowledge, credentials, and experience and that

DOT will not hire individuals for positions who do not have adequate credentials.

- **Peer review.** According to OSTP's guidance, agencies' policies should ensure that data and research used to support policy decisions undergo independent peer review by qualified experts, where feasible and appropriate, and consistent with law. We found that all nine of the selected agencies have addressed this component. For example, DOE's scientific integrity policy, which FE follows, addresses this component by stating that supervisors should ensure that data and research used to support policy decisions are supported through independent peer review by qualified experts.
- **Conflicts of interest.** OSTP's guidance instructs agencies to set clear standards governing conflicts of interest. We found that all nine of the selected agencies have addressed this component. For example, NIH's policy addresses this component by describing the importance of avoiding conflicts of interest and citing federal regulations and additional agency guidance on ethical conduct for NIH employees.
- **Whistleblower protections.** OSTP's guidance states that agencies' policies should adopt appropriate whistleblower protections. We found that all nine of the selected agencies have addressed this component. For example, ARS follows USDA's policy, which states that USDA complies with whistleblower laws, including the Whistleblower Protection Enhancement Act of 2012, and USDA employees may seek redress if they believe they have been improperly retaliated against for reporting an alleged violation of the scientific integrity policy. The Whistleblower Protection Enhancement Act of 2012 extends whistleblower protections to government scientists who challenge censorship under certain conditions.¹⁵
- **Free flow of scientific and technological information.** According to OSTP's guidance, agencies should facilitate the free flow of scientific and technological information, consistent with privacy and classification standards. We found that all nine of the selected

¹⁵Under the Whistleblower Protection Enhancement Act of 2012, a protected disclosure for censorship purposes is any disclosure of information by an employee or applicant for employment that the employee or applicant reasonably believes is evidence of censorship related to research, analysis, or technical information, if it is or will cause (1) any violation of any law, rule, or regulation; or gross mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety; and (2) such disclosure is not specifically prohibited by law or classified. Pub. L. No. 112-199, 126 Stat. 1465, 1471 (2012).

agencies have addressed this component. For example, NOAA's scientific integrity policy states that the agency will ensure the free flow of scientific information online and in other formats, consistent with privacy and classification standards, and in keeping with other Commerce and NOAA policies.

- **Conveying scientific and technological information to the public.** OSTP's guidance states that agencies' policies should establish principles for conveying scientific and technological information to the public. We found that all nine of the selected agencies have addressed this component. For example, NASA's scientific integrity policy addresses this component by stating that NASA facilitates the free flow of scientific and technological information among scientists and engineers, between NASA staff and the scientific and technical community, and between NASA employees and the public. The policy goes on to cite additional NASA policies on dissemination of information and public access to data.

Similarly, we found that all nine of the selected agencies address all of the components of the principle *professional development of government scientists and engineers*. OSTP's guidance states that agencies should establish policies that promote and facilitate the professional development of government scientists and engineers. The guidance also states that policies should be consistent with federal ethics rules, job responsibilities, and existing agency policies regarding political appointees, and should address five specific components of this principle. Below are the five components of this principle, and examples of how some of the nine selected agencies address these components:

- **Publication of research findings.** OSTP's guidance states that agencies should encourage scientists to publish research findings in peer-reviewed, professional, or scholarly journals. We found that all nine of the selected agencies have addressed this component. For example, EPA's scientific integrity policy states that the agency encourages publication and presentation of research findings in peer-reviewed, professional, or scholarly journals and at professional meetings.
- **Presentation of research findings.** According to OSTP's guidance, agencies should encourage scientists to present research findings at professional meetings. We found that all nine of the selected agencies have addressed this component. For example, DOE's scientific integrity policy, which FE follows, states that scientists and engineers are encouraged to present findings at professional meetings, subject to notifying their supervisor.

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- **Professional society editors and board members.** OSTP's guidance states that agencies should allow government scientists to become editors or editorial board members of professional or scholarly journals. We found that all nine of the selected agencies have addressed this component. For example, FAA follows DOT's scientific integrity policy, which states that, to the extent permitted by federal ethics laws and regulations, DOT scientists can participate in professional societies and serve on committees, boards, and other working groups of these societies.
 - **Participation in professional societies.** OSTP's guidance states that agencies should allow scientists to fully participate in professional or scholarly societies, committees, task forces, and other specialized bodies of professional societies, including removing barriers for serving as officers or on governing boards of such societies. We found that all nine of the selected agencies have addressed this component. For example, NIST's scientific integrity policy states that the agency supports scientists' full participation in professional or scholarly societies, committees, task forces, and other specialized bodies of professional societies, with proper legal review and approval. The policy goes on to cite separate NIST guidance for staff on how to seek approval for memberships and participation in professional organizations.
 - **Awards.** OSTP's guidance states that agencies should allow scientists to receive honors and awards for their research and discoveries with the goal of minimizing, to the extent practicable, disparities in the potential for private-sector and public-sector scientists and engineers to accrue the professional benefits of such honors or awards. We found that all nine of the selected agencies have addressed this component. For example, NIH has an awards policy, separate from its scientific integrity policy, that states that employees may accept gifts associated with contributions to the biomedical sciences that are recognized by outside organizations in the form of awards and honors, which are subject to the certain guidelines and limitations.

Most of the Selected Agencies Have Taken Some Actions to Help Achieve the Objectives of Their Scientific Integrity Policies, and Some Have Monitored and Evaluated the Policies' Implementation

The nine selected agencies have taken some actions to help achieve the objectives of their scientific integrity policies in the three areas we reviewed. Specifically, seven of the nine agencies educate or communicate to staff about their policies, eight of the nine have designated a scientific integrity official to provide oversight of the implementation of their policies, and four of the nine monitor and evaluate implementation of their scientific integrity policies.

Most of the Selected Agencies Have Taken Some Actions to Educate and Communicate to Staff about Their Scientific Integrity Policies

According to our analysis, seven of the nine selected agencies have taken some actions to educate and communicate to staff about their scientific integrity policies. Specifically, five agencies—ARS, EPA, NIH, NOAA, and USGS—provide training to help educate and communicate to staff about their scientific integrity policies, with each agency covering a different set of issues as part of its training. For example:

- ARS and USDA officials stated that ARS started requiring training for all staff in 2017 that includes whistleblower protections and political interference.
- EPA's scientific integrity policy also requires training for all of the agency's staff and, according to EPA officials, is required every 2 years. Like ARS' training, EPA's training covers whistleblower protections and political interference, along with other topics.
- NIH requires training for all newly hired scientists and for some current scientists on research ethics that includes aspects of scientific integrity, such as conflicts of interest and the peer-review process.
- USGS requires all staff to take a one-time scientific integrity training course and all scientists to take training every 2 years that includes the topics of conflicts of interest and whistleblower protections.
- NOAA officials stated that the agency offers ad hoc training on scientific integrity for its staff that is not required. Training topics include understanding codes of conduct and ethics and encouraging

publication of research findings, among other things. NOAA officials noted that the ad hoc training has helped to increase awareness of its scientific integrity policy. In addition, according to NOAA officials, scientific integrity officials can have, upon request, conversations with staff, including managers, about scientific integrity issues. NOAA officials stated that they are developing an online training module that will be available to all NOAA employees.

Two of the seven selected agencies—FAA and NASA—do not offer training but have taken other actions to help educate and communicate to staff about their policies. For example, FAA and DOT officials stated that DOT has a committee consisting of associate administrators and directors of its agencies, including FAA, who discuss and disseminate information on scientific integrity within their agencies as necessary. NASA created a handbook on scientific integrity that is available online to all staff. In addition, NASA officials stated that the agency’s Chief Scientist oversees a science council that meets monthly to discuss issues related to scientific integrity and disseminates related information across the agency, including changes to the agency’s scientific integrity policy.

In contrast, two of the nine selected agencies—FE and NIST—have not provided scientific integrity training for staff, according to officials, or taken other actions to promote their scientific integrity policies with staff. According to officials, the agencies have made their policies available to staff on their websites. Under the 2007 America COMPETES Act, civilian agencies that conduct scientific research are, among other things, required to widely communicate and readily make accessible to all employees their scientific integrity policies and procedures.¹⁶ In addition, under *Standards for Internal Control in the Federal Government*, management should internally communicate the necessary quality information to achieve the entity’s objectives, such as communicating information down and across reporting lines, to allow staff to perform key roles in achieving objectives and addressing risks.¹⁷ We have previously reported that mandatory training can be one way for management to internally communicate quality information down and across reporting lines to allow staff to perform key roles in achieving objectives.¹⁸

¹⁶42 U.S.C. § 6620(b)(4).

¹⁷GAO-14-704G.

¹⁸GAO, *Veteran Affairs Research: Actions Needed to Help Better Identify Agency Inventions*, GAO-18-325 (Washington, D.C.: Apr. 25, 2018).

FE and NIST officials gave different reasons why they believe no additional actions beyond posting their scientific integrity policies on their websites were needed. Specifically, DOE and FE officials stated that the culture of scientific integrity has been established across the department and that they therefore believe that staff are aware of scientific integrity issues. NIST officials said that scientific integrity is “the heart” of the NIST culture and that the agency relies on “word of mouth” to spread information on scientific integrity issues. Also, NIST officials stated that scientific integrity has not been a problem at NIST because the agency does not directly use the results of their research to formulate public policy or promulgate regulations, although officials did add that NIST research could be used by other agencies and Congress in policymaking decisions. NIST officials suggested, however, that they may consider adding information on scientific integrity to the agency’s annual, required whistleblower training.¹⁹ By taking action to educate and communicate their scientific integrity policies to staff through, for example, regular training, the agencies would have better assurance that employees have the information, skills, and competencies they need to help achieve their scientific integrity objectives.

Most of the Selected Agencies Have a Designated Official to Provide Oversight of the Implementation of Their Scientific Integrity Policies

Eight of the nine selected agencies have designated a scientific integrity official, or the equivalent, who is responsible for overseeing the agencies’ implementation of their scientific integrity policies. Specifically, ARS, FAA, NIH, NIST, NOAA, and USGS, or their respective departments, and EPA and NASA have such officials. For example, USGS has its own scientific integrity official who, along with Interior’s scientific integrity official, conducts preliminary reviews and inquiries of allegations of violations of scientific integrity, among other administrative duties. NASA’s Office of the Chief Scientist is responsible for overseeing and implementing the agency’s scientific integrity policy. For example, the Chief Scientist is responsible for developing and maintaining the agency’s handbook on scientific integrity and ensuring that directors at the agency’s research centers inform staff about NASA’s scientific integrity policy.

¹⁹Pub. L. No. 107-174, 116 Stat., 566 (May 15, 2002). The No FEAR Act of 2002, which took effect October 1, 2003, was intended to make federal agencies more accountable for their violations of employment discrimination and whistleblower protection laws. The act holds agencies accountable by, among other things, requiring agencies to provide employees written notification of and training on their rights under the laws covered by the act.

In contrast to these eight agencies, FE, which follows DOE's scientific integrity policy, does not have a scientific integrity official or the equivalent. DOE's scientific integrity policy states that the Secretary of Energy will designate a scientific integrity official for the department. However, DOE has not yet appointed one. According to DOE's order that provides guidance on implementing the scientific integrity policy, the scientific integrity official is to serve as an ombudsperson for all matters related to scientific integrity within the department and provide, among other things, informal mediation services to personnel who reach out with concerns or issues regarding scientific integrity.²⁰ DOE officials explained that the scientific integrity official has not been designated because the scientific integrity policy was implemented in January 2017, as the administration was changing, and that the current Secretary has not yet designated a scientific integrity official. Additionally, DOE officials did not recognize that the department needed to designate an official until we raised this issue with them. DOE officials did not know what steps were being taken to designate a scientific integrity official nor the time frame for doing so. Establishing a time frame to fill the scientific integrity official position would help DOE achieve the objectives of its scientific integrity policy. Furthermore, by designating a scientific integrity official to oversee its scientific integrity activities, DOE would have better assurance that it is providing effective management support to help achieve the objectives of its scientific integrity policy at FE and other agencies.

Some of the Selected Agencies Monitored and Evaluated Implementation of Their Scientific Integrity Policies

Four of the nine selected agencies—ARS, EPA, NASA, and NIH—have taken or have planned actions to monitor and evaluate the performance of their activities under their scientific integrity policies. For example, ARS is subject to USDA's review of all departmental regulations, including its scientific integrity policy, which is required every 5 years. EPA administered a survey to all EPA employees in 2016 as part of a broader effort to formally evaluate its scientific integrity policy and assess the current culture of scientific integrity. The survey asked respondents about their experiences with and opinions of scientific integrity at EPA, and the agency used the results of the survey to assess the effectiveness of the agency's policy. NASA's policy, updated in December 2017, requires the agency's Chief Scientist to lead an internal review every 3 years to ensure that NASA has appropriate scientific integrity standards. NASA

²⁰U.S. Department of Energy, *Scientific Integrity*, DOE O 411.2 (Washington, D.C.: January 4, 2017).

officials said that the first review is planned for 2020. NIH administers an annual self-assessment survey on management controls through which scientific directors identify and report potential issues related to scientific integrity, among other things.

However, the remaining five agencies—FAA, FE, NIST, NOAA, and USGS—have, for different reasons, not taken actions to monitor and evaluate the performance of their activities under their scientific integrity policies. DOE and FE officials said they were not aware of any steps that the department or agency was taking to monitor and evaluate DOE’s scientific integrity policy. They added that they thought DOE’s scientific integrity culture was “in a good place.” NOAA officials said that the agency does not monitor activities under its scientific integrity policy but that they have used the results of a survey conducted by the Union of Concerned Scientists to help understand scientific integrity issues in the agency. USGS officials stated that the agency has not taken action to monitor and evaluate activities under its scientific integrity policy but said that they believe the agency should find a way to measure the effectiveness of its scientific integrity activities. NIST officials and FAA and DOT officials explained that their agencies have not monitored and evaluated implementation of their policies because they have not had any alleged violations of their scientific integrity policies since NIST and DOT established their policies in 2011 and 2012, respectively.

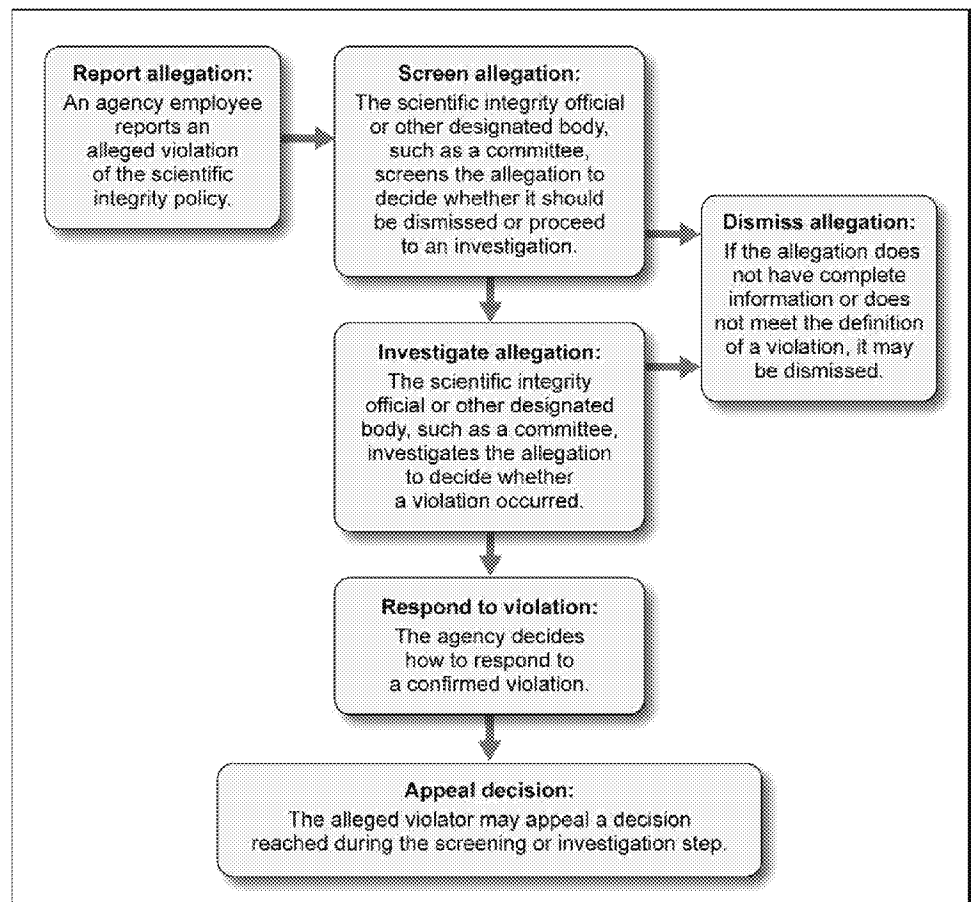
Standards for Internal Control in the Federal Government states that management should design control activities to achieve objectives and respond to risks, which may include establishing activities to monitor performance measures and indicators.²¹ Monitoring activities may include comparisons and assessments relating different sets of data to one another so that analyses of the relationships can be made and appropriate actions taken. By establishing mechanisms to effectively monitor their implementation of their scientific integrity policies, agencies may be better positioned to evaluate and measure whether their scientific integrity policies are achieving their objectives and, where necessary, improve their implementation.

²¹GAO-14-704G.

Most of the Selected Agencies Have Procedures for Identifying and Addressing Alleged Violations of Scientific Integrity Policies

Seven of the nine selected agencies—ARS, EPA, FAA, NIH, NIST, NOAA, and USGS—have specific, documented procedures for identifying and addressing alleged violations of their scientific integrity policies. Although the details of agencies' procedures may vary, the procedures generally include five basic steps: (1) report allegation, (2) screen allegation, (3) investigate allegation, (4) respond to violation, and (5) appeal decision (see fig. 1).

Figure 1: General Procedure for Identifying and Addressing Alleged Violations of Selected Agencies' Scientific Integrity Policies



Source: GAO analysis of selected agencies' information. | GAO-19-265

Note: The seven selected agencies that have procedures similar to this figure are the Agricultural Research Service, Environmental Protection Agency, Federal Aviation Administration, National Institutes of Health, National Institute of Standards and Technology, National Oceanic and Atmospheric Administration, and U.S. Geological Survey.

Below are the five basic steps for identifying and addressing alleged violations of scientific integrity policies, and examples from the seven selected agencies that have specific procedures:

- **Report allegation.** All seven of the selected agencies that have procedures include a step for agency employees to report alleged violations of their scientific integrity policies. The methods for reporting allegations vary by agency. Some agencies' procedures explicitly encourage employees to informally discuss concerns with a scientific integrity official before making a formal allegation; others do not. For example, EPA provides employees the opportunity to discuss their concerns with a scientific integrity official prior to reporting a formal allegation, according to EPA's procedures. Additionally, agencies differ in requirements for reporting allegations. For example, as outlined in NIH's procedures, employees may report formal allegations through any means to any NIH or HHS official, including scientific integrity officials. NOAA employees, in comparison, must submit allegations in writing to the agency's scientific integrity official, according to NOAA's procedures.
- **Screen allegation.** All seven of the selected agencies that have procedures include a step for the scientific integrity official or other designated body, such as a committee, to screen the allegation to decide whether it should be dismissed or proceed to an investigation. For example, NOAA's scientific integrity official screens the allegation and may form a committee for assistance with that assessment.
- **Investigate allegation.** All seven of the selected agencies that have procedures include a step for the scientific integrity official or other designated body, such as a committee, to investigate the allegation and to decide whether it should be dismissed or if a violation occurred. All seven agencies' procedures for the investigation step are similar. Generally, the scientific integrity official collects information from various sources, may convene a committee to assist in reviewing the information, and issues a report or memorandum to explain the decision.
- **Respond to violation.** All seven of the selected agencies that have procedures include a step to respond to a confirmed violation. The officials who decide on the response vary by agency and for some agencies vary case by case. At EPA, for example, a scientific integrity official or a convened committee decides whether a violation occurred, and a designated official from the alleged violator's office decides how to respond to any confirmed violations. At NOAA, the official or officials who decide whether a violation occurred vary case

by case, as determined by the Deputy Under Secretary for Operations, and these officials should have had no direct prior involvement with the allegation and should not be in the chain of command for either the person making the allegation or the person alleged to be in violation, according to NOAA's procedures. Disciplinary measures for scientific integrity violations at NOAA are typically handled by the alleged violator's supervisor and other managers, according to NOAA officials. FAA was the only one of these agencies to include a role for a political appointee in its procedures during this step. In particular, the FAA Administrator decides how to respond to a violation.²²

- **Appeal decision.** Six of the seven selected agencies that have procedures include a step to appeal decisions reached during the screening or investigating steps. Generally, these decisions may be appealed by the alleged violator. FAA is the only one of the selected agencies that does not include a step to appeal the decision. Instead, DOT's scientific integrity official conducts a follow-up review to decide whether the violation was successfully addressed or whether further actions are needed. According to DOT and FAA officials, should the scientific integrity official determine that further action is necessary, that action is raised to the Deputy Secretary of DOT for consideration.

In contrast, two of the nine selected agencies—FE and NASA—do not have specific, documented procedures for identifying and addressing alleged violations of their scientific integrity policies. The 2009 presidential memo on scientific integrity states that each agency should have in place procedures to identify and address instances in which the scientific process or the integrity of scientific and technological information may be compromised.²³ Additionally, federal internal control standards state that management should design control activities to achieve objectives and respond to risks, such as by clearly documenting internal control in management directives, administrative policies, or operating manuals.²⁴ FE, which follows DOE's scientific integrity policy, does not have specific procedures because DOE has not established any. DOE and FE officials said staff can report allegations to a supervisor, the whistleblower

²²The FAA Administrator is appointed by the President and confirmed by the Senate.

²³The White House, *Memorandum for the Heads of Executive Departments and Agencies, Scientific integrity* (Washington D.C.: March 9, 2009).

²⁴GAO-14-704G.

ombudsperson, or the U.S. Office of Special Counsel (OSC).²⁵ Similarly, NASA officials said employees can report allegations through their chain of command, such as to a supervisor, for investigation on a case-by-case basis. However, without documented procedures for identifying and addressing alleged violations of their scientific integrity policies, DOE and NASA do not have assurance that all staff have a clear understanding of how to report allegations and that investigations will be conducted consistently.

We also found that federal employees at six of the nine selected agencies—ARS, EPA, NIH, NASA, NOAA, and USGS—had reported alleged violations of scientific integrity policies, ranging from one allegation at ARS to 70 at EPA. However, not all such reported allegations were found to be violations of scientific integrity policy. Reported allegations may not be violations for several reasons, including that the allegation had insufficient information, the alleged action did not fall within the scope of the scientific integrity policy, or the investigation did not identify evidence that a violation occurred. For example, ARS officials said their agency received one allegation between May 2014 and the end of 2017, but it was not found to be a violation. Similarly, NOAA officials said that none of the 11 allegations they received between fiscal years 2012 and 2017 were found to be violations.²⁶ USGS officials said that of the 12 allegations that they received between fiscal years 2010 and 2017, two were found to be violations. Officials at EPA said that of the 70 allegations they received between fiscal years 2012 and 2017, 18

²⁵OSC is an independent federal investigative and prosecutorial agency whose primary mission is to safeguard the merit system in federal employment by protecting employees and applicants for federal employment from prohibited personnel practices, including reprisal for whistleblowing. OSC also reviews claims of wrongdoing within the federal government from current federal employees, former employees, and applicants for federal employment. When OSC receives allegations, OSC attorneys review the information to evaluate whether there is a substantial likelihood that the information discloses a violation of any law, rule, or regulation; or gross mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety. If OSC determines that the disclosed information meets the “substantial likelihood” standard, OSC refers information to an agency head for an investigation, and the agency must investigate the allegations and submit a written report to OSC on the agency’s findings. See 5 U.S.C. § 1213.

²⁶NOAA combines data on reported scientific integrity allegations with data on reported research misconduct allegations, and it is not possible to determine how many of these allegations are for scientific integrity violations. Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research or in reporting research results. Office of Science and Technology Policy, *Federal Policy on Research Misconduct*, 65 Fed. Reg. 76260 (December 6, 2000).

were found to be violations. According to EPA officials, they believe the agency has a relatively high number of allegations because EPA has been very proactive in encouraging staff to report scientific integrity issues.

In contrast, three agencies—FAA, FE, and NIST—had no alleged violations reported since their scientific integrity policies went into effect in April 2012, March 2012, and December 2011, respectively. Officials at these agencies offered several possible reasons. For example, DOT and FAA officials said the absence of reported allegations at FAA is an indicator that the scientific integrity policy has been successful in preventing violations from occurring. FE and NIST officials explained that scientific integrity issues are uncommon at their agencies because they focus on conducting basic science and generally do not directly use the results of their research to formulate public policy or promulgate regulations.

Conclusions

Assuring the public of the integrity of federally funded science that informs public policy decisions depends, in part, on agencies having sound scientific integrity policies, ensuring that the objectives of their policies are achieved, and addressing alleged violations. All nine of the selected agencies have established scientific integrity policies that are generally consistent with principles specified in OSTP's guidance and have taken some action to help ensure that the objectives of their scientific integrity policies are achieved.

In addition, seven of the nine selected agencies have taken actions to educate and communicate to staff about their scientific integrity policies, but DOE and NIST did not take such actions aside from making policies available on agency websites. By taking action to educate and communicate their scientific integrity policies to staff through, for example, regular training, the two agencies would have better assurance that their employees have the information, skills, and competencies they need to help achieve their scientific integrity objectives.

Further, eight of the selected agencies designated a scientific integrity official, or the equivalent, who oversees implementation of their scientific integrity policies. However, FE does not have such an official because its department, DOE, has not yet designated one and DOE has not established steps or a time frame to designate the official. By establishing steps and a time frame to fill the scientific integrity official position, DOE

would be better positioned to achieve the objectives of its scientific integrity policy.

Furthermore, while four of the nine selected agencies have taken steps to evaluate and monitor implementation of their scientific integrity policies, the other five—FE, FAA, NIST, NOAA, and USGS—have not taken action to do so. By establishing mechanisms to monitor the implementation of their scientific integrity policies, these five agencies would be better positioned to know whether their policies are achieving their objectives and what improvements are necessary.

Finally, while seven of the nine selected agencies have specific, documented procedures for identifying and addressing alleged violations of their scientific integrity policies, two agencies—FE and NASA—do not have such procedures. Without developing documented procedures for identifying and addressing violations of their scientific integrity policies, DOE and NASA do not have assurance that all staff have a clear understanding of how to report allegations and that investigations will be conducted consistently.

Recommendations for Executive Action

We are making a total of 10 recommendations, including four to DOE, two to NIST, one to NOAA, one to DOT, one to USGS, and one to NASA. Specifically:

- The Secretary of Energy should take action to educate and communicate the agency's scientific integrity policies to staff through, for example, regular training. (Recommendation 1)
- The Director of NIST should take action to educate and communicate the agency's scientific integrity policies to staff through, for example, regular training. (Recommendation 2)
- The Secretary of Energy should establish steps and a time frame for designating a scientific integrity official to oversee the department's scientific integrity activities. (Recommendation 3)
- The Secretary of Energy should develop mechanisms to regularly monitor and evaluate implementation of the department's scientific integrity policy, including mechanisms to remediate identified deficiencies and make improvements where necessary. (Recommendation 4)
- The Secretary of Transportation should develop mechanisms to regularly monitor and evaluate implementation of the department's

scientific integrity policy, including mechanisms to remediate identified deficiencies and make improvements where necessary. (Recommendation 5)

- The Director of NIST should develop mechanisms to regularly monitor and evaluate implementation of the agency's scientific integrity policy, including mechanisms to remediate identified deficiencies and make improvements where necessary. (Recommendation 6)
- The NOAA Administrator should develop mechanisms to regularly monitor and evaluate implementation of the agency's scientific integrity policy, including mechanisms to remediate identified deficiencies and make improvements where necessary. (Recommendation 7)
- The Director of USGS should develop mechanisms to regularly monitor and evaluate implementation of the agency's scientific integrity policy, including mechanisms to remediate identified deficiencies and make improvements where necessary. (Recommendation 8)
- The Secretary of Energy should develop documented procedures for identifying and addressing alleged violations of its scientific integrity policy. (Recommendation 9)
- The Administrator of NASA should develop documented procedures for identifying and addressing alleged violations of its scientific integrity policy. (Recommendation 10)

Agency Comments and Our Evaluation

We provided a draft of this report to Commerce, DOE, DOT, EPA, HHS, Interior, NASA, OSTP, and USDA for review and comment. We received written comments from Commerce, DOE, DOT, Interior, and NASA that are reprinted in appendixes II through VI and summarized below. We received comments via email from OSTP that are also summarized below. HHS told us that it did not have comments on the draft report, but it provided technical comments, which we incorporated as appropriate. EPA and USDA told us that they had no comments on the draft report.

All six of the agencies and departments to which we made recommendations stated that they agreed with the recommendations and all six agencies provided technical comments, which we incorporated as appropriate. The agencies' comments are summarized below:

- In Commerce's written comments, reproduced in appendix II, the department stated that it anticipates NIST and NOAA will address our recommendations within a year of the issuance of this report. In an

enclosure to Commerce's letter, NIST identified ways to provide training and to evaluate its scientific integrity policy annually. Also in the enclosure to Commerce's letter, NOAA said that it will identify metrics for monitoring and evaluating the implementation of its scientific integrity policy. NOAA also explained that it has monitored its scientific integrity policy by reporting annually on the number of allegations adjudicated and it has taken actions to update components of its scientific integrity policy. However, as we describe in our report, monitoring and evaluating implementation of policies should include comparing actual to expected performance to determine whether policies are achieving their objectives.

- In DOE's written comments, reproduced in appendix III, the department explained that once a scientific integrity official has been designated, that official will be responsible for leading and coordinating with other offices across DOE to develop measures to educate and communicate to staff about scientific integrity policies, develop procedures to monitor and evaluate implementation of the department's scientific integrity policy, and develop processes for identifying and addressing alleged violations.
- In DOT's written comments, reproduced in appendix IV, the department stated that it is committed to ensuring the integrity with which research is conducted and research results are disseminated to the public. DOT also stated that its scientific integrity policy is comprehensive and effective, as evidenced by the department not having any formal complaints filed. However, not having reported allegations is not a reliable measure of the effectiveness of a policy. Instead, as we describe in the report, comparing actual to expected performance of policies can determine whether policies are achieving their objectives.
- In Interior's comments, reproduced in appendix V, the department stated that USGS plans to address our recommendation by surveying USGS employees to gauge their awareness of the scientific integrity policy and the effectiveness of that policy and by giving survey respondents the opportunity to provide information about key scientific integrity issues at USGS.
- In NASA's comments, reproduced in appendix VI, the agency estimated that it will address our recommendation by October 2020.

In its emailed comments, OSTP's General Counsel did not specify whether OSTP agreed or disagreed with the recommendations, but stated that the report could be strengthened by linking the recommendations to evidence of scientific integrity issues within an agency, or elements of

scientific integrity that required improvement within an agency. Our report, however, points out the effects in each area of our findings, and those effects are reiterated in the Conclusions section above. For example, for our recommendation to agencies to monitor and evaluate their scientific integrity policies, we explain that such monitoring and evaluation would better position agencies to know whether their policies are achieving their objectives and what improvements are necessary.

We are sending copies of this report to the appropriate congressional committees; the Secretaries of Agriculture, Commerce, Energy, Health and Human Services, Interior, and Transportation; the Administrators of the Environmental Protection Agency and the National Aeronautics and Space Administration; the Director of the Office of Science and Technology Policy; and other interested parties. In addition, this report is available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-6888 or neumannj@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix VII.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'John Neumann', with a long horizontal flourish extending to the right.

John Neumann
Managing Director
Science, Technology Assessment, and Analytics

Appendix I: Scope and Methodology

This report examines the extent to which selected agencies (1) have scientific integrity policies that are consistent with federal guidance on scientific integrity, (2) have taken actions to help ensure the objectives of their scientific integrity policies are achieved, and (3) have processes for identifying and addressing alleged violations. In particular, we reviewed agencies' scientific integrity policies and did not assess the extent to which agency officials may try to influence scientific research, nor did we examine how scientific and technological information is used in agencies' development of public policy.

For all three objectives, we selected a nongeneralizable sample of nine agencies—seven agencies from cabinet-level departments and two independent agencies. Our findings are not generalizable to all agencies but provide illustrative examples of these agencies' scientific integrity policies and their actions to implement those policies. To select agencies, we considered the following:

1. The America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science (COMPETES) Act of 2007,¹ which required the Director of the Office of Science and Technology Policy (OSTP) develop federal guidance on scientific integrity policies for civilian federal agencies that conduct scientific research and employ federal scientists.
2. OSTP's 2010 guidance on scientific integrity for executive departments and agencies.² Following the 2010 guidance, 24 departments and agencies developed scientific integrity policies.
3. The National Science Foundation's annual list of federal obligations for intramural research and development. We used the National Science Foundation's list of fiscal year 2015 obligations because it was the most current list at the time of our review.
4. We also considered agencies' approaches to implementing OSTP's guidance in order to capture a range of practices in our sample.

¹Pub. L. No. 110-69, 121 Stat., 572 (2007). This requirement was to be carried out in consultation with the Director of the Office of Management and Budget and the heads of all federal civilian agencies that conduct scientific research.

²Office of Science and Technology Policy, Scientific Integrity, Memorandum for the Heads of Executive Departments and Agencies (December 17, 2010), accessed October 26, 2018, <https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/scientific-integrity-memo-12172010.pdf>.

To select agencies from cabinet-level departments, we identified agencies that have intramural scientists—federal scientists who are not contractors or grantees—and missions that are primarily focused on non-military and non-security related purposes. We also considered agencies with the greatest levels of funding for intramural research in each department.³ The seven agencies we selected are the

- Agricultural Research Service (ARS) in the U.S. Department of Agriculture (USDA);
- Federal Aviation Administration (FAA) in the Department of Transportation (DOT);
- National Institutes of Health (NIH) in the Department of Health and Human Services (HHS);
- National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce (Commerce);
- National Institute of Standards and Technology (NIST) in Commerce;
- Office of Fossil Energy (FE) in the Department of Energy (DOE); and
- U.S. Geological Survey (USGS) in the Department of the Interior (Interior).

To select the two independent agencies, we identified agencies that have intramural scientists and missions that are not primarily focused on national security. We selected the two agencies with the greatest levels of funding for intramural research. The two independent agencies we selected are the

- National Aeronautics and Space Administration (NASA) and
- Environmental Protection Agency (EPA).

To determine the extent to which selected agencies have scientific integrity policies that are consistent with federal guidance on scientific integrity, we compared agencies' scientific integrity policies and related documents to two of the four principles listed in OSTP's guidance.⁴ Specifically, the two principles are: *foundations of scientific integrity in*

³For ease of reporting, we used the term "agencies," even in cases in which the agency is relying on a department-implemented policy or process.

⁴OSTP's guidance on scientific integrity has four main sections with guidance, which we refer to as principles, and the four principles have subsections, which we refer to as components.

government and professional development of government scientists and engineers. We focused on these two principles because they most closely align with scientific integrity issues related to political influence and censorship of scientists. We determined that an agency addresses a principle or component if its scientific integrity policy, related policies, or actions directly address a principle or component. Of the nine selected agencies, ARS, FE, and FAA follow scientific integrity policies developed by their respective departments—USDA, DOE, and DOT, respectively. In those cases, we included the departments’ policies, processes, and related documents in our analyses. We also interviewed OSTP officials, officials at all nine selected agencies, the agencies’ Offices of Inspectors General that have done work in this area, and the U.S. Office of Special Counsel. Table 1 shows the two principles, their corresponding components, and descriptions, as stated in OSTP’s 2010 guidance:

Table 1: Selected Scientific Integrity Principles and Components from the Office of Science and Technology Policy’s 2010 Guidance

Principles and components	Description
Foundations of scientific integrity in government	Successful application of science in public policy depends on the integrity of the scientific process both to ensure the validity of the information itself and to engender public trust in government.
1. Culture of scientific integrity	Scientific progress depends upon honest investigation, open discussion, refined understanding, and a firm commitment to evidence. Science, and public trust in science, thrives in an environment that shields scientific data and analyses from inappropriate political influence; political officials should not suppress or alter scientific or technological findings.
2. Selection of candidates for scientific positions	Ensure that selection of candidates for scientific positions in the executive branch is based primarily on their scientific and technological knowledge, credentials, experience, and integrity.
3. Peer review	Ensure that data and research used to support policy decisions undergo independent peer review by qualified experts, where feasible and appropriate, and consistent with law.
4. Conflicts of interest	Set clear standards governing conflicts of interest.
5. Whistleblower protections	Adopt appropriate whistleblower protections.
6. Free flow of scientific and technological information	Facilitate the free flow of scientific and technological information, consistent with privacy and classification standards.
7. Conveying scientific and technological information to the public	Document principles for conveying scientific and technological information to the public.
Professional development of government scientists and engineers	Agencies should establish policies that promote and facilitate, as permitted by law, the professional development of government scientists and engineers. Such policies should, consistent with federal ethics rules, job responsibilities, and existing agency policies regarding political appointees.
1. Publication of research findings	Encourage publication of research findings in peer-reviewed, professional, or scholarly journals.

Principles and components	Description
2. Presentation of research findings	Encourage presentation of research findings at professional meetings.
3. Professional society editors and board members	Allow government scientists and engineers to become editors or editorial board members of professional or scholarly journals.
4. Participation in professional societies	Allow full participation in professional or scholarly societies, committees, task forces, and other specialized bodies of professional societies, including removing barriers for serving as officers or on governing boards of such societies.
5. Awards	Allow government scientists and engineers to receive honors and awards for their research and discoveries with the goal of minimizing—to the extent practicable—disparities in the potential for private-sector and public-sector scientists and engineers to accrue the professional benefits of such honors or awards.

Source: GAO analysis of Office of Science and Technology Policy information. | GAO-19-265

To determine the extent to which the selected agencies have taken actions to help ensure the objectives of their scientific integrity policies are achieved, we compared the selected agencies' scientific integrity policies and actions to implement their policies against federal standards for internal controls.⁵ Specifically, *Standards for Internal Control in the Federal Government* states that (1) management should internally communicate the necessary quality information to achieve the entity's objectives, such as communicating information down and across reporting lines, to allow staff to perform key roles in achieving objectives and addressing risks; (2) an oversight body should oversee the entity's internal control systems; and (3) management should establish mechanisms to monitor their internal control systems, evaluate the results, and remediate identified internal control deficiencies on a timely basis. We compared these standards against the selected agencies' actions to implement their scientific integrity policies because these standards are relevant to ensuring that an agency's program meets its objectives. We reviewed selected agencies' documents and interviewed agency officials about actions the agencies have taken to (1) educate and communicate to staff about scientific integrity policies, (2) provide oversight of agencies' policies and their implementation, and (3) monitor and evaluate agencies' policies. We also interviewed representatives of stakeholder groups to learn about practices that agencies could take to address the OSTP guidance. Specifically, we reviewed documents and interviewed representatives from the Union of Concerned Scientists, Public Employees for Environmental Responsibility, and the Institute for Defense Analyses' Science and Technology Policy Institute. We selected

⁵GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.: September 2014).

these stakeholders because they were nongovernmental stakeholders that had recently reported on scientific integrity-related issues at the time of our review. These stakeholders' comments cannot be generalized to other stakeholders.

To determine the extent to which the selected agencies have procedures for identifying and addressing alleged violations, we reviewed the selected agencies' documented procedures and compared these procedures to federal guidance and to federal standards for internal control. Specifically, we compared the agencies' procedures to the 2009 presidential memorandum on scientific integrity, which states that each agency should have in place procedures to identify and address instances in which the scientific process or the integrity of scientific and technological information may be compromised.⁶ We also compared the agencies' procedures against the *Standards for Internal Control in the Federal Government*, which state that management should design control activities to achieve objectives and respond to risks, such as by clearly documenting internal control in management directives, administrative policies, or operating manuals.⁷ Additionally, we interviewed representatives from the Union of Concerned Scientists, Public Employees for Environmental Responsibility, and the Institute for Defense Analyses' Science and Technology Policy Institute.

We conducted this performance audit from March 2018 to April 2019 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

⁶The White House, Office of the Press Secretary, *Scientific Integrity*, Memorandum for the Heads of Executive Departments and Agencies (Washington, D.C.: March 9, 2009).

⁷GAO-14-704G.

Appendix II: Comments from the Department of Commerce



UNITED STATES DEPARTMENT OF COMMERCE
The Secretary of Commerce
Washington, D.C. 20230

March 11, 2019

Mr. Rob Marek
Assistant Director
Natural Resources and Environment
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Marek:

Thank you for the opportunity to review and comment on the Government Accountability Office's (GAO) draft report titled *Scientific Integrity Policies: Additional Actions Could Strengthen Integrity of Federal Research* (GAO-19-265).

On behalf of the Department of Commerce, I have enclosed our comments on the draft report. The Department agrees with the recommendations and anticipates implementing them within one year of the final report issue date. We will provide more details on how and when the Department will address the recommendations in the action plan that is required 180 days after issuance of the final GAO report.

If you have any questions, please contact MaryAnn Mausser, Commerce GAO/OIG Liaison, at (202) 482-8120.

Sincerely,

A handwritten signature in black ink that reads "Wilbur Ross".
Wilbur Ross

Enclosure

**National Institute of Standards and Technology's Comments on
GAO Draft Report titled *Scientific Integrity Policies: Additional Actions Could Strengthen
Integrity of Federal Research*
(GAO-19-265)**

The National Institute of Standards and Technology (NIST) has reviewed the draft report, and we offer the following comments for GAO's consideration.

Comments on Recommendations

The Government Accountability Office (GAO) made two recommendations to NIST in the report.

- **Recommendation 2:** The Director of NIST should take action to educate and communicate the agency's scientific integrity policies to staff through, for example, regular training.

Response: NIST concurs with this recommendation.

Scientific integrity is a core value at NIST, and NIST's greatest strength is its reputation for uncompromising rigor and technical excellence. During NIST's orientation for all new employees, NIST emphasizes that keeping scientific work independent of political interference is of the utmost importance and that doing so is, again, a core value of NIST. Although there is currently not an explicit reference to NIST's scientific integrity directives in the orientation materials, the importance of scientific integrity itself is conveyed to all employees, along with the NIST Directives system of which the scientific integrity directives are part (all directives are readily accessible on the NIST Intranet).

NIST will add an explicit reference to NIST Policy 5100.00, Scientific Integrity; NIST Order 5101.00, Scientific Integrity; and NIST Procedure 5101.01, Reporting and Resolving Allegations Regarding Violations of Scientific Integrity, to the new employee orientation packet, and will provide specific training regarding these directives during orientation. NIST will also make the training materials available to all employees on the NIST Intranet. NIST will also work with Commerce's National Oceanic and Atmospheric Administration (NOAA) to ensure that NIST employees will have access to any pertinent NOAA online training as well.

- **Recommendation 6:** The Director of NIST should develop mechanisms to regularly monitor and evaluate implementation of the agency's scientific integrity policy, including mechanisms to remediate identified deficiencies and make improvements where necessary.

Response: NIST concurs with this recommendation.

NIST's Scientific Integrity Officer (SIO) and Office of the Chief Counsel (OCC) for NIST is each responsible for implementing portions of NIST Procedure 5101.01, Reporting and Resolving Allegations Regarding Violations of Scientific Integrity. The NIST Director has directed that, beginning with Fiscal Year 2019, the NIST SIO and OCC/NIST are to meet at least annually to review implementation of the NIST Scientific Integrity Policy and Order, and to evaluate and make recommendations to the NIST Director as to whether any improvements are needed.

Department of Commerce
National Oceanic and Atmospheric Administration
Response to the GAO Draft Report titled
Scientific Integrity Policies: Additional Actions Could Strengthen Integrity of
Federal Research
(GAO-19-265, February 2019)

General Comments

In the draft report, *Scientific Integrity Policies: Additional Actions Could Strengthen Integrity of Federal Research*, the Government Accountability Office (GAO) reviewed nine federal agencies' scientific integrity policies, which are subject to the Office of Science and Technology and Policy's (OSTP) guidelines. Within the Department of Commerce, GAO reviewed the scientific integrity policies for the National Oceanic and Atmospheric Administration (NOAA) and the National Institute of Standards and Technology. The review considered how these policies addressed scientific integrity in a GAO-selected subset of categories in OSTP's guidance.

The report adequately captures elements of NOAA's scientific integrity policy and procedures and found that NOAA conformed to OSTP's guidance. Specifically, the report found that: NOAA's policy is consistent with federal guidance on scientific integrity; NOAA has taken action to ensure the scientific integrity objectives are achieved; and NOAA's procedures for identifying and addressing alleged violations of its scientific integrity policy are established. GAO further found that NOAA should develop mechanisms to regularly monitor and evaluate the results of its policy. It is important to note that the NOAA scientific integrity policy encompasses both research misconduct and scientific integrity and is therefore broader in scope and purpose than the GAO focus.

While the report is well written, we note one area of clarification regarding how NOAA has monitored and evaluated the results of its policy. Prior to GAO's review, NOAA monitored its scientific integrity activity by reporting annually on the number of allegations adjudicated. Additionally, pursuant to Section 10.05 of its Scientific Integrity Policy, the NOAA Research Council reviews the policy at least every two years to ensure that it is current and effective. For example, in 2017, NOAA revised the Procedural Handbook that accompanies NOAA's Scientific Integrity Policy (NOAA Administrative Order 202-735D) to improve the process for evaluating and adjudicating scientific misconduct allegations. Also, the NOAA Research Council revised the NOAA Framework for Internal Review and Approval of Fundamental Research Communications in 2016. This activity was not noted in the draft report.

NOAA Response to GAO Recommendations

As a result of the review, GAO made one recommendation to NOAA.

Recommendation 1: “The NOAA Administrator should develop mechanisms to regularly monitor and evaluate implementation of the agency’s scientific integrity policy, including mechanisms to remediate identified deficiencies and make improvements where necessary.”

NOAA Response: NOAA concurs with this recommendation.

NOAA’s Deputy Under Secretary for Operations and NOAA’s Scientific Integrity Officer (SIO) will identify additional metrics for monitoring and evaluating the implementation of the scientific integrity policy. The metrics may include monitoring elements such as developing and implementing an online scientific integrity training module, tracking and reporting participation in ad hoc training sessions, and conducting internal surveys. The NOAA annual report could also include the number of consultations handled by the SIO in addition to the already provided number of allegations, thus augmenting this existing report.

Appendix III: Comments from the Department of Energy



The Deputy Secretary of Energy
Washington, DC 20585

March 15, 2019

Mr. John Neumann
Director
Natural Resources and Environment
U.S. Government Accountability Office
441 G Street N.W.
Washington, DC 20548

Dear Mr. Neumann:

Thank you for the opportunity to comment on the draft Government Accountability Office (GAO) report: *Scientific Integrity Policies: Additional Actions Could Strengthen Integrity of Federal Research* (GAO-19-265).

Since GAO's scope focused on federal intramural research, GAO's observations about the Department of Energy (DOE) included several references to the Department's Office of Fossil Energy (FE). It is important to note that FE is not an agency. FE is one of several research and development program offices in the Department. FE is the sole DOE program office that stewards a Government-Owned Government-Operated laboratory, the National Energy Technology Laboratory (NETL), which conducts intramural research. The remainder of the 17 National Laboratories in the Department's National Laboratory System conduct extramural research.

Given GAO's focus on FE in this scientific integrity review, DOE would like to ensure readers understand that FE and NETL are compliant with scientific integrity principles. As GAO's report noted, all of the selected agencies, including DOE and FE, addressed all of the components of the two principles of scientific integrity.

FE's scientists and engineers, including those at NETL, adhere to the highest standards of scientific integrity. Federal and contract staff and supervisors throughout FE are trained to observe the highest standards of ethical conduct, including critical ethical elements directly addressing scientific integrity. As shared with the GAO during the course of the review, FE's cadre of scientists and engineers consistently practice and are attuned to the principles and requirements of scientific integrity through training and professional development, federal research engagements, collaboration with the broader science and engineering community, professional associations, and professional publications, among other things. Because of the extensive focus on FE, the areas highlighted in this report, while relevant, provide a limited perspective on these central practices and experiences in a science research organization that are arguably more material to the objectives of this inquiry.

DOE would like to clarify that ownership and implementation of DOE's scientific integrity policy is a Department level responsibility and all DOE offices have responsibilities to



comply with the Department's Scientific Integrity Policy (DOE P 411.2A), which covers "all federal staff; contractor personnel; political appointees; those working at the DOE under the Intergovernmental Personnel Act; federal staff working in the National Nuclear Security Administration; and any other personnel that are involved with scientific and technical information." All DOE employees must also comply with DOE Order 411.2, "Scientific Integrity," and related Department mandates.

The draft report contains a total of 10 recommendations, of which GAO directs four recommendations (recommendations 1, 3, 4, and 9) to DOE. DOE concurs with each of the four recommendations in the report and provides the following comments. Estimated completion dates are subject to change predicated on the plan of action and milestones developed by the new scientific integrity officer.

Recommendation 1: The Secretary of Energy should take action to educate and communicate the agency's scientific integrity policies to staff through, for example, regular training.

DOE Response: DOE concurs with the recommendation. While DOE will start the education and communication immediately, it will be the responsibility of the scientific integrity official to lead and coordinate with other elements of the Department in the development of measures to educate and communicate the Department's scientific integrity policies to staff.

Estimated Completion Date: June 30, 2020.

Recommendation 3: The Secretary of Energy should establish steps and a timeframe for designating a scientific integrity official to oversee the Department's scientific integrity activities.

DOE Response: DOE concurs with the recommendation.

Estimated Completion Date: December 31, 2019.

Recommendation 4: The Secretary of Energy should develop mechanisms to regularly monitor and evaluate implementation of the Department's scientific integrity policy, including mechanisms to remediate identified deficiencies and make improvements where necessary.

DOE Response: DOE concurs with the recommendation. The Department's scientific integrity official will have the responsibility to lead, and coordinate with other elements of the Department, in developing procedures to monitor and evaluate implementation of the Department's scientific integrity policy, including mechanisms to remediate identified deficiencies and make improvements where necessary.

Estimated Completion Date: June 30, 2020.

3

Recommendation 9: The Secretary of Energy should develop documented procedures for identifying and addressing alleged violations of its scientific integrity policy.

DOE Response: DOE concurs with the recommendation. It will be the responsibility of the scientific integrity official to lead, and coordinate with other elements of the Department, in developing procedures for identifying and addressing alleged violations of the Department's scientific integrity policy.

Estimated Completion Date: June 30, 2020.

Sincerely,



Dan Brouillette

Appendix IV: Comments from the Department of Transportation



U.S. Department
of Transportation
Office of the Secretary
of Transportation

1200 New Jersey Avenue, SE
Washington, DC 20590

Susan A. Fleming
Director, Physical Infrastructure Issues
U.S. Government Accountability Office (GAO)
441 G Street NW
Washington, DC 20548

FEB 21 2019

Dear Ms. Fleming:

The Department of Transportation (DOT) is committed to ensuring the integrity with which research is conducted and research results are disseminated to the public. The Department's Scientific Integrity Policy is designed to ensure the free flow of research results to the public via reports, journal publications, etc. Further, DOT employees have the option to publish their research results in refereed journals. DOT's Scientific Integrity Policy is comprehensive and effective, as evidenced by the Department having no formal complaints filed by a DOT employee, or by an external recipient of DOT research funding, claiming an impediment by management against publishing.

We concur with the GAO draft report recommendation to develop mechanisms to regularly monitor and evaluate implementation of the agency's scientific integrity policy. We will provide a detailed response to the recommendation within 180 days of the final report's issuance.

We appreciate the opportunity to respond to the GAO draft report. Please contact Madeline M. Chulunovich, Director, Office of Audit Relations and Program Improvement, at (202) 366-6512 with any questions.

Sincerely,

Keith Washington
Deputy Assistant Secretary for Administration

Appendix V: Comments from the Department of the Interior



United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, DC 20240

MAR 05 2019

Mr. John Neumann
Director, Natural Resources and Environment
U.S. Government Accountability Office
441 G Street NW
Washington, DC 20548

Dear Mr. Neumann:

Thank you for giving the Department of the Interior (Department) the opportunity to review and comment on the draft Government Accountability Office (GAO) report entitled, *Scientific Integrity Policies: Additional Actions Could Strengthen Integrity of Federal Research* (GAO-19-265). We appreciate GAO's review of the Federal agencies' scientific integrity policies and the actions taken to implement them as required by the Office of Science and Technology Policy (OSTP).

In response to its overall findings, the GAO issued several recommendations including one to the Department's U.S. Geological Survey (USGS). The following is a summary of USGS' planned actions to implement the report's recommendation:

Recommendation 8: The Director of USGS should develop mechanisms to regularly monitor and evaluate implementation of the agency's scientific integrity policy, including mechanisms to remediate identified deficiencies and make improvements where necessary.

Response: Concur. The USGS agrees, in general, with the GAO findings and recommendation. As a science organization, a robust scientific integrity policy and culture of scientific integrity are critical to our success, and the USGS welcomes the opportunity to continue to improve scientific integrity program effectiveness. The corrective actions we propose involves a biennial administration of a scientific integrity survey to USGS employees. The survey will gauge scientific integrity policy awareness and effectiveness at USGS, as well as give respondents the opportunity to provide information about key scientific integrity issues at USGS. We anticipate administering the first survey in Fiscal Year 2020. The survey results and Scientific Integrity Officer Council meeting recommendations will be incorporated into a biennial Scientific Integrity Report to the USGS Director. The report will include findings and recommendations for improvement.

The enclosure provides additional comments for your consideration when finalizing the report.

If you have any questions about this response, or need additional information, please contact
Dr. Byron Shumate, Departmental Scientific Integrity Coordinator at, 703-648-6610.

Sincerely,

Ryan Nichols

for Timothy R. Petty, Ph.D.
Assistant Secretary for
Water and Science

Enclosure

Appendix VI: Comments from the National Aeronautics and Space Administration

National Aeronautics and Space Administration
Headquarters
Washington, DC 20546-0001



FEB 27 2019

Reply to Attn of: Office of the Chief Scientist

Mr. John Neumann
Director
Natural Resources and Environment
United States Government Accountability Office
Washington, DC 20548

Dear Mr. Neumann:

The National Aeronautics and Space Administration (NASA) appreciates the opportunity to review and comment on the Government Accountability Office (GAO) draft report entitled, "Scientific Integrity Policies: Additional Actions Could Strengthen Integrity of Federal Research" (GAO-19-265) dated January 2, 2019.

In the draft report, GAO makes one recommendation to NASA intended to identify and address policy violations. Specifically, GAO recommends the following:

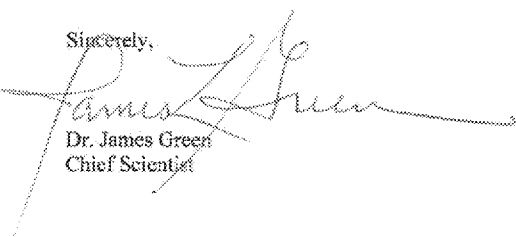
Recommendation: The Administrator of NASA should develop documented procedures for identifying and addressing alleged violations of its scientific integrity policy.

Management's Response: Concur. While NASA has previously developed a policy directive on Scientific Integrity (NPD 1920.1); Requirements for the Conduct of NASA Research and Technology (NPR 1080.1B); and a related handbook on scientific integrity, NASA will develop documented procedures for identifying and addressing alleged violations of scientific integrity beyond research and technology misconduct, which is currently addressed in NPR 1080.1B.

Estimated Completion Date: October 1, 2020.

Once again, thank you for the opportunity to comment on the subject draft report. If you have any questions or require additional information, please contact Laverne Drayton on (202) 358-1909.

Sincerely,


Dr. James Green
Chief Scientist

Appendix VII: GAO Contact and Staff Acknowledgements

GAO Contact

John Neumann, (202) 512-6888, neumannj@gao.gov

Staff Acknowledgements

In addition to the contact named above, Rob Marek (Assistant Director), Wyatt R. Hundrup (Analyst in Charge), Cheryl Harris, and Douglas G. Hunker made key contributions to this report. Also contributing to this report were Ellen Fried, Juan Garay, Cindy Gilbert, and Dan C. Royer.

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